AVOIDING AGINCOURT - RESTRUCTURING COMMAND AND CONTROL FOR THE 21ST CENTURY

A MONOGRAPH
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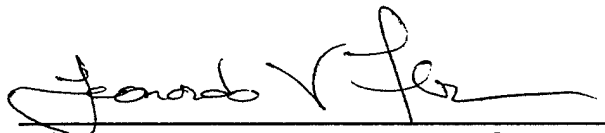

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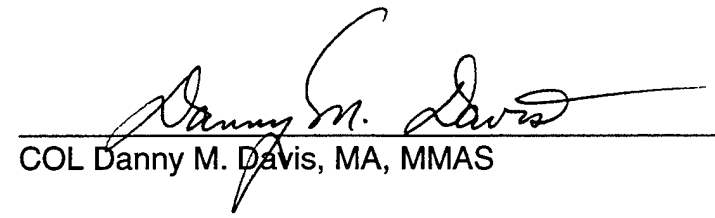

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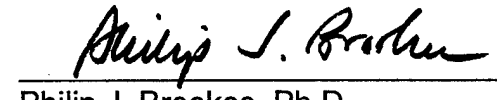

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ABSTRACT

Title: *Avoiding Agincourt – Restructuring Command and Control for the 21st Century* by John T. Smith, USA, 57 Pages

The US Army is on the brink of a revolution in military affairs (RMA). Significant advancements in informational technologies and precision warfare are providing unprecedented potential for future warfare. These changes challenge the appropriateness of traditional command and control (C2) forms. The current RMA will likely enable commanders to change the way they C2 units.

Given an RMA, one might believe that future warfare can impose more certainty on the battlefield and thereby make the commander's job easier, suggesting a change in the C2 method. Through an examination of history and the application of lessons learned, the author reaffirms the role that uncertainty plays in defining the command structure.

This monograph investigates Martin Van Creveld's three command forms (command by direction, command by plan, and command by influence) to propose a form for the Army of the 21st Century. The monograph focuses on how each form deals with uncertainty in battlespace. The author concludes that command by influence is the likely candidate for the command form of the 21st Century.

Implications of this study suggest a necessary change in leader development and highlight the need for a more efficient method of C2 in the future battlespace. Army 2010 needs farsighted leadership now to write the doctrine, train and equip the force that will continue to deter enemy aggression in the 21st Century.

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Chapter 1

The Changing Nature of Warfare

> Taken as a whole, present-day military forces, for all the imposing array of electronic gadgetry at their disposal, give no evidence whatsoever of being one bit more capable of dealing with the information needed for the command process than were their predecessors a century or even a millennium ago.[1]
>
> Martin Van Creveld
> -- *Command In War*

Command and control (C2) of military forces is critical to the success of soldiers in battle. C2 becomes exponentially harder in an increasingly complex battlespace. The size and tempo of modern combat operations adds significantly to the complexity of the environment. History shows that these factors have increased exponentially over the years.[2] However, as shown in *Appendix A: Command and Control Functions,* the basic functions of C2 remain constant. This dichotomy develops the impetus for change to better meet the needs of the 21st Century. As the tempo and size of the battlespace continue to expand, exercising effective C2 over dispersed combat forces in a large theater of operations becomes harder.

Revolutionary changes in **technology, doctrine, and organizations** may be the answer that provides the solution to the problem. These changes may facilitate effective C2 in the future. Modern day theorists refer to these revolutionary changes, that occur simultaneously, as revolutions in military affairs (RMA).[3] By definition the old forms of

C2 will no longer be effective. The RMA will force C2 to change to meet the needs of the new environment.

These significant advances in technology may help to mitigate some of the difficulty commanding and controlling 21st Century warfare. Appendix B shows recent additions to the US military's inventory of weapons systems. These additions improve the capability to C2 by improving intelligence, surveillance and reconnaissance (ISR) assets and improving command, control, communications, computer applications, and intelligence processing (C^4I). It is important to note, however, that these additions add to the complexity of the C2 challenge as well.

The central purpose of this monograph is to learn more about one aspect of the 21st Century force: improving C2 in a increasingly complex environment. Learning more about C2 could provide the warriors of the 21st Century with options to help prevent them from being "caught off guard." In effect, they will be able to avoid a modern day Agincourt.

Considering the trend Martin Van Creveld enumerated in the epigraph, the US military does not want to be caught off guard at the dawn of warfare in the 21st Century. Learning more about C2 could help 21st Century leaders design systems that are "more capable of dealing with the information needed for the command process." This monograph will study each of three command styles proposed by Martin Van Creveld in order to determine the most suitable command form for the 21st Century.[4] The C2 style must be workable in the increasingly complex environment of future warfare.

Evolution of Command

It is prudent now to examine C2 in terms of what made C2 effective yesterday, what makes C2 effective today and what will make C2 effective in the future. This paper uses Martin Van Creveld's three forms of command as a basis to organize a discussion of the merits of each command form. Chapter 2 of this paper establishes the environment in which these command forms will operate. Chapter 3, 4 and 5 examines in detail each of command forms: command by plan, command by influence, and command by direction. Chapter 6 concludes that command by influence would best meet the needs of the 21st Century environment.

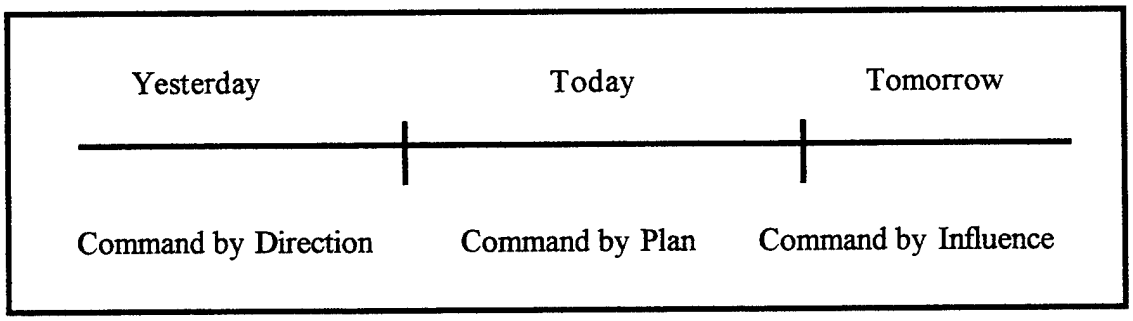

Figure 1 -- Evolution of Command

It's prudent now to acknowledge the beginnings of a revolution. Changes in technology, organization, and doctrine offer the possibility of reversing the evolution of command and once again returning to the commander the ability to command by direction. However, acknowledging the revolution is not enough. The US military must act now to avoid fighting the Battle of Agincourt again. The US military must tailor a command form to the requirements of the 21st Century.

Significance of the Study

The current RMA and the changing needs of the future security environment will have a significant effect on C2 at the operational level. In an era of global surveillance, modern military thinkers suggest that future conflicts are likely to be brief, intense and costly, requiring detailed and timely responses from thousands of miles away.[5]

A revolution in business affairs in the last two decades of the twentieth century improved the ability to process information tremendously. Technology changed the way organizations organize and do business. Super computers, global pagers, electronic mail systems, FAX machines and cell phones enabled a new generation of leaders to C2 organizations more efficiently. The introduction of these systems allowed the way Americans do business to change markedly.

Military commanders exploited this revolution in business affairs to improve the C2 throughout the military. A conscientious focus on improving military doctrine and equipment over the years advanced the ability to use systems but still has not made the commander's problem of C2 any easier. As complexity grows on the modern battlefield there is an ever- increasing struggle for imposing certainty on the battlefield. Operational commanders in Clausewitz' time wrestled with how to best C2. Still, at the dawn of the twenty-first century, operational commanders continue the struggle for improved C2. More information has not solved the commander's problem. This concept will force commanders to develop efficient systems for filtering out unprocessed information.

Just as the French during the Battle of Agincourt focused their efforts on the wrong enemy that led to their demise, a similar dangers exists today.[6] The US military

today may be focused on the wrong enemy or at least the wrong type of enemy. Today, some 583 years later, the U.S. military struggles with a new revolution. This revolution will drastically change the way men fight. However, despite greatly increased capabilities, uncertainty is still an essential element in war. Man is still faced with the age-old problem of mastering uncertainty to be successful in combat. Will 21st Century warfare force operational commanders to restructure command and control?

Chapter 2

The Environment

> Five trends that describe future warfare are: increased lethality and dispersion, increased volume and precision of fires, increased integration of technologies, achievement of greater mass and effect, and refinements in invisibility and detectability.[7]
>
> General Sullivan and Colonel Dubik,
> "Land Warfare in the 21st Century"

The changing nature of warfare enumerated by these trends suggests that the job of commanding and controlling military forces will likely become more difficult. Faced with this growing complexity, commanders will likely search out more efficient ways to command and control (C2) their forces.

These trends in warfare are so significant that Congress mandated two important studies during this past year: the Quadrennial Defense Review (QDR) and the National Defense Panel (NDP).[8] The focus of each of these studies is an examination of the international security environment and necessary changes to our current force structure to better meet the needs of the changing environment. Acknowledging these trends is the first step toward addressing the changing nature of warfare and developing an appropriate C2 form.

This monograph considers uncertainty as an essential element of war and acknowledges that change is continuous. Clausewitz addressed uncertainty saying that

"War is the realm of uncertainty; three quarters of the factors on which action in war is based are wrapped in a fog of greater or lesser uncertainty."[9] This assertion suggests uncertainty is the defining characteristic for the C2 of an organization. Modern theorists surmise that the one constant in modern warfare is change itself.[10] *Appendix B: Modern Day Complexity* suggests that the military will continue to change. New capabilities will emerge as the result of the numerous weapons systems that have been added to the US military's inventory. The magnitude of changes on the horizon will be significant.

Modern military leaders developed the present C2 system to fight conventional forces based on present-day demonstrated force capabilities and technologies. These systems served us well during the industrial age. However, with the increasing emphasis on a system of systems approach, current C2 protocols may be inadequate or inappropriate to deal with coming challenges.[11] Future warfare will likely demand more integration of systems and less use of human interface. Future C2 systems must make a quantum leap over current capabilities to be effective in 21st Century warfare.

The current RMA may engender these quantum leaps. RMAs, by their nature, often render current technologies and doctrine ineffective. The presence of an RMA, therefore, can significantly change the approach to warfare. Winners in the Spring 1997 Joint Force Quarterly Essay Contest all suggest that we are on the brink of an RMA which will significantly change warfare. Captain James Stavridis (USN) suggests that we are at the beginning of a revolution that will take advantage of a "...complete architecture of detection, selection, display, targeting and attack." to revolutionize warfare. [12] Lieutenant Colonel Arsenio Gumahad (USAF) suggests that an RMA may be on the

horizon. Gumahad contends that the new battleground involves the information domain.[13] Doctor James J. Schneider suggests that we are in a revolution that reflects the latest information revolution. Schneider suggests that the US military is in the fourth control crisis that the RMA will solve.[14]

The fact that modern theorists believe the US military to be at the start of an RMA gives credence to a study of restructuring C2 for the 21st Century. What, if anything, should be done about the way commanders command and control, considering the suggested trends for future warfare?

Future Security Environment

The writers of this year's Quadrennial Defense Review make the assessment that the threat of a "horrific, global war has receded."[15] However, they quickly caveat this assessment with knowledge that "...new threats and dangers -- harder to define and more difficult to track -- have gathered on the horizon."[16] James Woolsey, Former Director of the Central Intelligence Agency sums up this point succinctly:

> Yes, we have slain a large dragon. But, we now live in a jungle filled with a bewildering variety of poisonous snakes and, in many ways, the dragon was easier to keep track of.[17]

However, there are important changes on the horizon. The difficult challenge for the US is avoiding the snakes while maintaining its warfighting skills.

We live in an environment where technology improves by a factor of ten every four to seven years.[18] We must understand change. These rapid developments encourage military planners to regularly assess the equipment and doctrine for relevancy. Colonel

David A. Fastabend highlights the importance of establishing doctrine as an engine of change in a recent article entitled "Endless Evolution."[19] In his article, he contends that doctrine ought to be forward thinking and remain relevant to the systems and equipment being employed.

Today, in a security environment characterized by asymmetry and uncertainty this is particularly hard to do. The challenge is two-sided and requires maintaining "...sufficient military strength to continue to deter interstate war ... while at the same time growing military capabilities that can prevent and defeat asymmetrical threats."[20] As technology enables the future battlespace to become more connected and as information dominance becomes a reality, the commander's C2 tools must change.

21st Century Warfare

General Sullivan and Colonel Dubik's "five trends of future warfare" present a myriad of challenge for C2. Each trends adds to the growing complexity of future battlespace in a new and different way. The environment of 21st Century warfare will be significantly more complex than today's environment and consequently harder to command and control.

Joint Vision 2010 (JV 2010) considers changes on the horizon and provides a common focus for 21st Century warfare. JV 2010 is the conceptual framework for organizing America's armed forces for 21st Century warfare. JV 2010 channels the vitality and innovation of America's armed forces and leverages technological opportunities to achieve new levels of effectiveness in joint warfighting.[21] JV 2010 will

have a significant impact on how the operational commander commands and controls his forces.

Operational objectives that define desired capabilities of America's armed forces are an integral part of JV 2010 and, consequently, affect the approach to C2. These operational objectives include: Dominant Maneuver, Precision Engagement, Focused Logistics, Full-Dimensional Protection and Information Superiority.[22] They define warfare in the early part of the 21st Century. These operational objectives will enable and may even require operational commanders to restructure their approach to C2 to be successful in the battlespace of the 21st Century.

Considering the nature of the future command environment, the recommended forms of C2 for Force XXI must provide C2 for:

- increased lethality and dispersion
- increased volume and precision of fires
- increased integration of technologies
- achievement of greater mass and effect
- refinements in invisibility and detectability

Complexity

Dynamic complexity is what makes C2 tough. It is an exercise in managing uncertainty. Mitchell Waldrup defines complexity in his book *Complexity: The Emerging Science at the Edge of Order and Chaos* as "a great many agents interacting with each other in a great many ways."[23] This aptly describes US military operations

both now and in the future. The functioning of systems with a multitude of parts that interact inconsistently describes the dynamic complexity evident in the military.[24]

The inconsistent manner is the challenge that leaders face. Dynamic complexity is non-linear, where no clear cause and effect relationships exist between the variables. Dynamic complexity involves the interaction of many converging systems operating over time where the endstate cannot be forecasted with accuracy. Some indicators of dynamic complexity at work include actions that:

- have dramatically different effect in the short run and the long.[25]
- have one set of consequences locally and a very different set of consequences in another part of the system.[26]
- do not produce expected outcomes.[27]

Dynamic complexity continues to challenge C2 forms. It is natural to seek out forms of C2 that will allow man and machine in the next century to better cope with the uncertainties caused by dynamic complexity.

Evolution of Command

Up to the 18th Century, commanders were able to effectively control units from a position where they could see and hear the battlefield. Frederick the Great enjoyed a high level of centralized C2 and often located himself on the high ground to personally direct his subordinate commanders. Commanders up to the time of Napoleon **commanded by direction**.

Napoleon commanded by direction during the years before fully developing the corps system of the Grande Armee. At the battle of Jena, Martin Van Creveld suggests that Napoleon commanded the battle from a central position overlooking the main

effort.[28] He was not able to overlook the entire battlefield, only small pieces of the battlefield. He could hear the guns and see much of the force. The "Battle Captain" required a steady stream of messengers to run missives to his corps commanders and at times even to his division and regimental commanders. Additionally, Napoleon required a directed telescope to help develop his situational awareness throughout much of his command.

Despite Napoleon's success at Jena, Napoleon realized he needed a command form that better suited the needs of the entire force. He therefore revised his C2 style to address the expanding battlefield and the growing complexity of his time. In the end, even given the limited size of the battlefield in Napoleon's day, Napoleon was not able to command by direction.[29] The complexity of the battlefield was too great for one man to manage.

As battlefields grew, command by direction at the operational level became increasingly difficult and eventually unmanageable. Just as Napoleon realized, other commanders realized that they would have to decentralize their control. Commanders began focusing on influencing the plan during the orders process because the size and complexity of the battlefield had grown to such a level that it made command by direction unrealistic. Operational commanders who wanted to influence the battle relied on plans to exert their influence. They **commanded by plan**. The Schlieffen Plan typifies this approach to C2. This method is still the predominant method of C2 today.

In the interwar years of this century, a third trend in C2 developed—**Command by influence.** Command by influence operates well in the dynamic complexity of

modern warfare. Command by influence considers uncertainty inevitable and attempts to deal with it by using mission-type orders to distribute uncertainty to the lowest levels of command. Commanders who command by influence train subordinates to exercise initiative and exploit opportunities using the commander's intent as a guide.

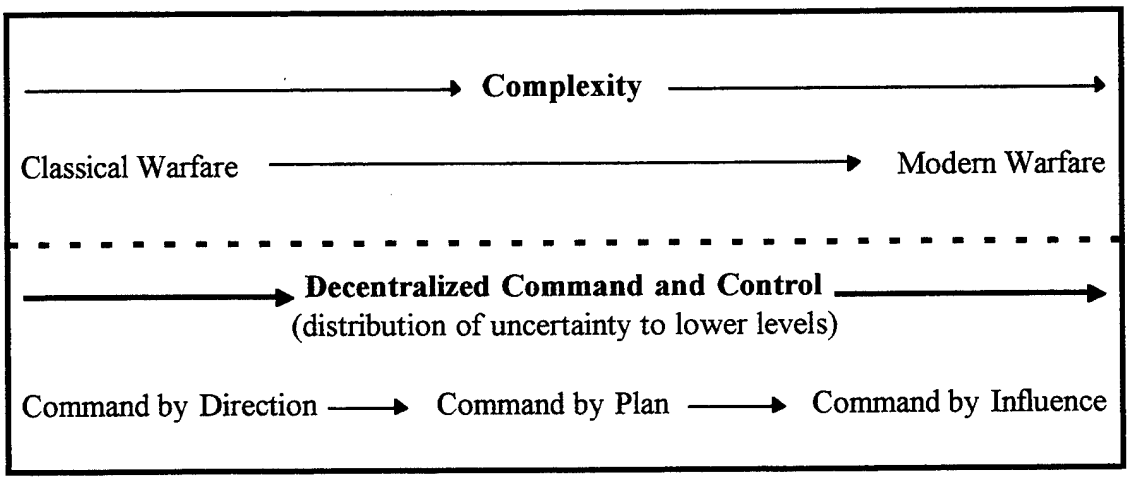

Figure 2 -- Evolution of Command and Control

Figure 2 outlines the relationships that exist between complexity and C2. The figure considers trends from classical through modern warfare. Frederick the Great popularized command by direction during the age of classical warfare. Napoleon established the command by plan to deal with the growing complexity of 19th Century warfare. The German Army introduced the command by influence using the Auftragstaktik or mission-oriented command system.[30] As warfare continues to grow in complexity there is a corresponding need that seeks to distribute uncertainty to lower command levels.

Given that uncertainty and change are two essential elements of war and that there is a growing complexity in modern warfare, it seems natural for a form of C2 to evolve

that allows modern commanders to better cope in this environment. Some futurists see the possibility of being able to reverse the "evolution" with revolutionary changes in technology, organization, and doctrine. In simple terms, they believe that the information revolution will provide sufficiently reliable and widely available technologies that allow commanders to better manage the complexity. This empowers a C2 form that is relatively better than that of the enemy.

Summary

The environment has significant influence on the most suitable form of command for future warfare. The degree of complexity in the future environment will undoubtedly make C2 harder. While technology promises ways to better deal with the increasingly complex environment, it is itself an engine of ever increasing complexity. To date C2 has been able to evolve into three forms in response to the changing environment. The next three chapters investigate each form of C2 to determine the style that will likely operate best in an environment of warfare dominated by "five trends of future warfare" described by Dubik and Sullivan.

Chapter 3

Command by Plan

In preparing for battle I have always found that
plans are useless, but planning is indispensable.[31]

General Dwight D. Eisenhower
Khrushchev, Six Crises

In this chapter, the author studies the command-by-plan style of C2 by defining the term, examining a case study, and judging likely performance in future warfare. The intent is to establish a better appreciation of how suitable the command-by-plan style of C2 is for 21st Century warfare.

Command by plan is a centralized form of C2 worked out beforehand.[32] The form emphasizes developing a course of action to respond to what the unit believes the enemy will do in the future. Generally, friendly forces base their actions during the execution phases on preplanned scenarios developed during the planning phase.

Here are the mechanics of how command by plan works. During the planning process, the unit determines how it will fight. This forces the friendly unit to make educated decisions about what the enemy will do in specific situations in the future. Friendly forces generally develop a plan to fight the enemy based on the most likely enemy course of action (COA). Branches to the friendly plan deal with other likely enemy COAs. Planners develop sequels to the plan based on the expected outcomes of current operations.

Here is what it means to prioritize uncertainty. During the planning process the friendly unit considers a myriad of possible COAs. The unit analyzes each COA to determine which one is most likely and which one is most dangerous. The unit then bases the friendly COA on the most likely enemy COA. Prudent planners develop a branch plan here that addresses the enemy's most dangerous COA. These educated decisions have the effect of prioritizing uncertainty.

At the conclusion of the planning process the unit has a product, the decision support template (DST), that will help them deal with executing their plan. The DST captures graphically all decision points and projected situations identified during the planning process. The DST indicates when, where, and under what conditions the commander must make a decision to initiate a specific friendly COA. [33] Therefore the commander and staff often use this tool during the execution to help respond to enemy actions on the battlefield with prepared responses.

The problem that arises with the use of command by plan is the maintenance of the initiative. If the unit loses the initiative to the enemy, it is very difficult to preempt enemy actions by a plan in this reactive posture. Consider the troubles that the 106th had in executing their plan at Saint Vith.

Case Study: Command by Plan at Saint Vith

This case study focuses on the actions of Major General Alan W. Jones during the defense of Saint Vith. MG Jones commanded the US Army's 106th Infantry Division in the Battle of the Bulge. The 106th Division defended an 8-mile deep, 22-mile wide salient into the German line. This battle took place at Saint Vith, a key hub where six roads

intersected in the Ardennes Region of Belgium. Saint Vith was a major chokepoint for the German main effort during the Battle of the Bulge.

The 106th started occupying positions along the front on 10 December 1944. MG Jones assumed responsibility for the area at 1900 hours, 11 December. Final elements of the division occupied positions along the front on 12 December. Four days later the main effort of the German Western Front destroyed the 106th while they defended this previously "quiet section of the line."

MG Jones commanded the 106th by plan. He and his staff developed and implemented a plan based on the previous unit's plan to defend the area. The plan called for two of his regiments to defend forward around a plateau, a third regiment to defend in depth and a cavalry group to defend an important gap in the line.[34]

Throughout the early part of the defense, Jones and his staff tried to "react appropriately in the unfamiliarity of combat and the chaos of the overwhelming attack."[35] The following passage suggests the magnitude of the problem:

> Jones' headquarters, which had barely had time to establish itself as a functioning division entity since it arrived in Saint Vith, must have quickly become overwhelmed by the countless reports of numerous German attacks on virtually all of its deployed units throughout the morning hours of that first day. Nevertheless, Jones and his staff reacted to the increasing number of assaults by ordering units from the division's meager reserve force to each of the threatened areas and by keeping Middleton [VIII Corps Commander] and the VIII Corps staff informed of the developing (and deteriorating) situation.[36]

MG Jones and his staff developed a course of action on the evening of 16 December that ultimately sealed the fate of his unit. They decided to fight from their somewhat prepared positions. However, the enemy was too much for them.

After a period of intense fighting, the enemy was able to cut off the regiments of the 106th from their division headquarters. This placed the division headquarters in a difficult situation: trying to make decisions without the advantage of situation reports from the front line units. After suffering in the uncertainty for a period of time, confusion and chaos won out, the headquarters lost control and the division staff quickly became ineffective. The situation deteriorated quickly on 17 December when the 106th prioritized all the uncertainty of the overwhelming enemy attack in a counterattack plan that they could not initiate. The enemy was acting faster than the 106th could react.

Analysis

MG Jones commanded by plan during the battle at Saint Vith. MG Jones and his staff developed a counterattack plan beforehand to which they responded during execution.

Uncertainty played a significant role in the defense of Saint Vith. Unfortunately, in this situation, uncertainty took control from the unit. This is the story of what happened to a unit who prioritized uncertainty and subsequently was not able to overcome the difficulties that faced their unit on 16 and 17 December 1944.

An overall assessment of the situation suggests that the command-by-plan form did not meet the dynamic needs of this division on the battlefield at Saint Vith. For example, consider how little of the plan the commander and staff used in the actual

defense. It is very evident that the course of action that the staff furiously worked out on the morning of 16 December was not useful to the regiments fighting on this day. Perhaps here, too, MG Jones found the plans his staff had frantically developed useless. Another perspective to consider is how much of the division's plan helped the terrible fate of those two front line regiments that the enemy destroyed. The command-by-plan style did not help the 106th effectively fight. By the 17th, no amount of planning at division level would be able to extricate the 106th from the dire situation.

Consider the outcome at Saint Vith. The 106th suffered miserably. Uncertainty about the enemy and friendly situation plagued the 106th. The situation could have been drastically different had MG Jones managed uncertainties differently. For example, given better situation awareness, the corps commander responsible for this section of the line would have never placed such an inexperienced unit in the enemy's main effort. Given better situation awareness, the 106th could have planned to better integrate the counterattack of the 7th Armored Division. Given better situation awareness, the corps commander could have ordered the 106th to pull back sooner. Given better situation awareness, they could have precluded the "fog of war" from taking control of their unit.

However, this was not the case. Uncertainty played major roles at every level of command. At division, there was no relevant common picture of the situation that faced the 106th. At corps, they did not understand how badly the division was suffering. Even at Army level, they did not realize the severity of the situation at Saint Vith. At best these commanders fought the plan that they developed and not the enemy that was devastating the 106th. They tried to make the plan they developed work, but the enemy

never gave them a chance. Consequently, the division suffered dearly. The price for uncertainty at Saint Vith was high; at least seven thousand soldiers and a substantial amount of arms and equipment were lost.[37]

Conclusion

Despite the 106th's valiant efforts to overcome uncertainty, the command-by-plan form of C2 was not enough. MG Jones was not able to command and control his unit in a manner that allowed him to wrestle the initiative from the enemy and take control of the situation. This case study demonstrated that MG Jones' use of command by plan was not responsive enough to preempt the enemy's plan of attack. In this contest of wills, MG Jones lost his vote.

The importance of this lesson learned is very evident in this World War II scenario. Unfortunately, it is not necessary to look further than a rotation at the National Training Center (NTC) to see the same lesson learned each month. Commanders routinely learn that C2 must adapt quickly to the enemy. The *NTC Trends Compendium* notes the inability of commanders and staffs to battle track and conduct predictive analysis for the last ten quarters of training.[38]

Commanders and their staffs have been on a quest to overcome uncertainty since earliest recorded history. Today the struggle continues.

Uncertainty

General Eisenhower's pithy statement at the beginning of this chapter suggests that it is not the **endstate** that is important but the **process** that is worthwhile. His words address the central problem with the "command-by-plan" form of C2:

commanders and units focus on the plan and loose sight of their focus on the enemy. Their focus often seems more on smooth execution of the plan that they developed than on the enemy that they are currently fighting. In many ways this is a natural human tendency to gravitate towards the certain and avoid the uncertain. General Eisenhower found benefit in the planning process because this is where he and his staff worked through plans that would allow his unit to respond to possible enemy actions. In effect, the 106th did not gain any value from the planning process.

Many leaders today suggest that command by plan focuses too much on planning and not enough on execution.[39] General Patton punctuates this thought: "Execution is to plan as 5 is to 1."[40] The regimen during the planning and preparation stages of the orders process often develops an ownership that haunts units during the execution. From the beginning, leaders develop the plan based on a "best guess" about what will happen after the unit crosses the line of departure. Wargaming sessions refine the plan again based on the "best guess" of the enemy's response to the friendly plan. These leaders disseminate the plan and take great care in ensuring that the unit understands the plan. Rehearsals focus on synchronizing combat power. Inspections continue throughout, ensuring individual and unit readiness to execute the plan. Units feel comfortable and proud of the preparation that they have done to fight the plan. However, units often meet with a less cooperative enemy once the execution phase begins. The enemy fights differently than the unit planned.

Because of the nature in which the command-by-plan form deals with uncertainty, this form fights the random nature of war as much as the adversary. Thomas J.

Czerwinski termed the form a futile quest to will order upon chaos in his article "Command and Control at the Crossroads."[41] Consider the planning done by MG Jones and his staff on the morning of the attack. Their quest was to develop a counterattack plan that would allow the 106th to reestablish the line. They based their plans on expected enemy actions and thereby tried to impose their order [plan] on the enemy. However, on this day the enemy voted against the plans of the 106th.

The often heard admonition to "Fight the enemy and not the plan!" is popular because many commanders and staffs try to organize the complexity of modern battlespace with a plan. Then, as the units come up against difficult situations in the execution of the plan, the units often times fall back to executing the familiar plan as opposed to fighting the unfamiliar enemy. Although this form of C2 is still in use today, Martin Van Creveld suggests those **"Command forms which attempt to prioritize uncertainty do not lend themselves to success."**[42]

Clausewitz captured the essence of the problem of the command-by-plan approach 170 years ago.

> Finally, the general unreliability of all information presents a special problem in war: all action takes place, so to speak, in a kind of twilight, which, like fog or moonlight, often tends to make things seem grotesque and larger than they really are. Whatever is hidden from full view in this feeble light has to be guessed at by talent, or simply left to chance. So once again for lack of objective knowledge one has to trust to talent or to luck.[43]

The unit attempts to manage the uncertainty by prioritizing during the planning phase what the enemy will do during the execution phase. In short, the commander bets on the likely enemy course of action using subjective knowledge of the enemy's intentions. As

Clausewitz has said, the commander must trust talent or luck. This was MG Jones first experience in combat, so there was not much talent to fall back on and all the luck was bad.

21st Century Warfare

Clearly, command by plan is an ineffective style in the context of contemporary warfare. How about the battles of the 21st Century? Some believe that the previously noted disadvantages in command by plan will no longer hold.[44] Advocates predict that a RMA will provide the capability to know the initial enemy disposition; the US will detect and report near simultaneously any movement that follows. Coupled with a capability to assess terrain and weather affects rapidly, the US Armed Forces of the future should be able to judge more accurately the enemy's intentions. In effect, a RMA will reduce to known factors the variables of enemy capability, enemy location, terrain, weather effects, and even time, thus effectively reducing the uncertainty in predicting what the enemy will do.[45]

Assume for the moment that a RMA will indeed provide near omniscience, a condition referred to as dominant battlespace knowledge (DBK).[46] It will only be fair, given the porous nature of US industrial security, to also assume that the enemy will possess a similar capability, even if perhaps a generation behind. Nonetheless, the US will have a technological edge. The proposition also implies that the US will establish a plan with branches and sequels that will account for the remaining uncertainty in what the enemy will do. Conceptually, the US will employ this plan much as a symphony orchestra would--in perfect concert. Therefore the synchronous effort of each system

produces an overwhelming synergy of all the instruments. In this case, there is little to no incentive to deviate from the rehearsed plan, "the musical score at hand."

In a situation where a commander is using DBK to command by plan, how will the commander likely do under the five conditions of future warfare described by Dubik and Sullivan?

☑ **Increased lethality and dispersion. Increased volume and precision of fires. Achievement of greater mass and effect. Increased integration of technology.** The overall effect of the US technology advantage is to reduce the area upon which the US will need to mass fires. This will make four of the five conditions a major US advantage in future warfare. Given better US technology, a predetermined series of actions, the plan, will allow the US to exploit four of the five trends. Therefore, the overall effect of having a well-developed plan combined with significant technology is a US advantage.

☑ **Refinements in invisibility and detectability.** The command-by-plan style of C2 offers the commander a limited amount of flexibility. If the enemy does something that the command has not prepared for then the likelihood of the enemy escaping the effects of mass, volume, and lethality is greater. Refinements in invisibility and detectability will favor the enemy because the enemy will be able to escape some of the effects of the other four trends.

There will be other key factors not readily apparent in the Dubik/Sullivan construct that favor the enemy force. First is less flexibility. In many ways, quantity is a

quality all its own. A smaller quantity of friendly systems, albeit superior systems, also means a greater proportion of the total capability disappears every time enemy forces damage or destroy a system. A smaller quantity also reduces the possible combinations and permutations. Second, dependence on plans will result in increased predictability, especially in a doctrine-impelled military such as the US Armed Forces. Less flexibility and increased predictability are possible unintended consequences of the advances of 21st Century warfare.

Exacerbating these unintended consequences is the inescapable complex nature of warfare. Knowing more is not necessarily an advantage in a complex environment. Since cause and effect are not consistently or directly linked in complex systems accurate and voluminous data may not translate to accurate or timely predictions of results. The overall effect of complexity here is additional work that may or may not ensure success.

Similarly, Clausewitz' notions of fog and friction go hand in hand with complexity. The capability to know more may not translate to knowing more about what the enemy will do. For example, an enterprising enemy could use this capability against us by "volunteering" information he wants known. The enemy commander has just created additional "fog" for the friendly commander. Worse, friction predicts that knowing more and having perfect plans are not sufficient to ensure flawless execution.

Ultimately, the ability to ad-lib and adjust, to be flexible and less dependent on predetermined plans, may prove more important than the technological edge leading to advantages in four of the five conditions described by Dubik and Sullivan.

Enemy	Friendly
Knowing more does not equal greater capability	Increased lethality and dispersion
Increased predictability of friendly forces	Increased volume and precision of fires
Less flexibility of friendly forces	Achievement of greater mass and effect
Refinements in invisibility and detectability	Increased integration of technologies

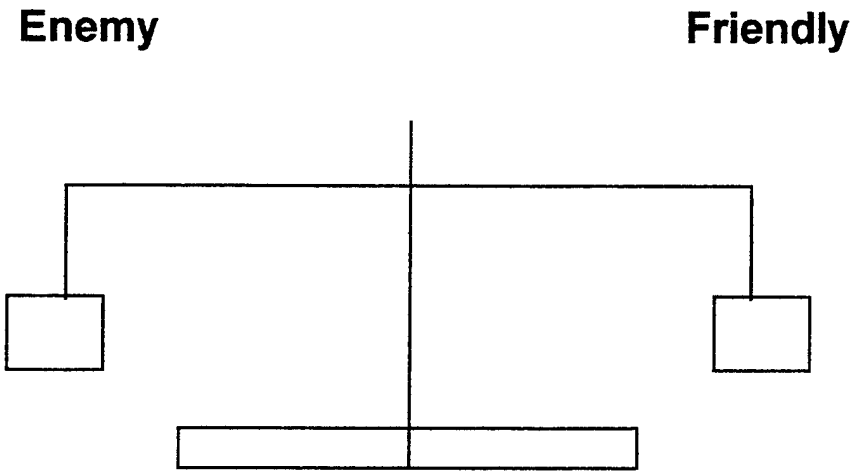

Figure 3 -- Command by Plan in Future Warfare

Summary

Command by plan did not serve MG Jones effectively during the Defense of Saint Vith. Considering Sullivan and Dubik's five trends of future warfare suggests that four of the trends will be an advantage for a command form that is able to exploit future technology with a series of "plug and play" options. Command by plan is therefore an efficient form that can take advantage of a myriad of "made to order" predetermined

options. Command by plan can work effectively in the complexity of the battlespace of 2010. However it is not without significant vulnerabilities.

Closer examination reveals that the seeming viability of command by plan may be illusory. Whatever efficiency US forces gain from technology are vulnerable to the debilitating effects of fog and friction, inherent traits of complex systems such as war. Barry Watts suggests in his essay entitled "Friction in Future War" that despite great technological advances, fog and friction will continue to play significant roles.

> So long as human purposes, frailties, proclivities, and limitations remain an integral part of war, Clausewitzian friction will retain the potential to make the difference between success and failure.[47]

Increased inflexibility and predictability, likely traits of a highly specialized force, will further decrease the effects of a future technological edge. A final thought is that the focus on technology may make friendly forces over dependent on technology and unable to otherwise respond to the enemy. These compelling arguments suggest that fog and friction may have the overall effect of balancing the scale. In the end, as illustrated in Figure 3, command by plan could result in parity, not superiority.

Chapter 4

Command by Influence

> From the youngest soldier upward, the total independent commitment of all physical and mental forces is to be demanded. Only thus can the full power of the troops be brought to bear.[48]
>
> German Regulations
> 1908 -- 1945

Not having found a suitable form of C2 for 21st Century warfare, the author continues the search. This chapter harkens back to World War II to see if technology could ignite new capabilities for the command-by-influence form of C2.

War is a wonderful motivator. This is evident in the German Army after World War I. The German Army worked very hard during the interwar years to efficiently integrate their combat power. Some of the more forward thinking leaders of the German Army began experimenting with tactics to accommodate the developing technologies of the tank and the aircraft. These ideas developed into a new and exciting type of warfare. Maneuver warfare was appropriately named blitzkrieg—lightening war. The possibilities that blitzkrieg offered held great promise.

However the Germans realized these possibilities would require changes to doctrine and organizations. This idea demanded a new approach to C2. To this end, some of the German leaders began looking for a less rigid system of C2 to command and control a much more active form of warfare. They developed what we know today as the

command-by-influence style of C2. This chapter investigates command by influence to determine its suitability for combat in 2010.

Command by influence is a method of C2 that allows commanders to operate in dynamic complexity where: "...inputs and outputs are not proportional; phenomena are unpredictable; unpredictability frustrates planning; solution as self organization defeats control and where a premium is placed on a holistic, intuitive process."[49] Command by influence considers uncertainty inevitable and attempts to deal with it by distributing uncertainty to the lowest levels of command. Commanders who command by influence train subordinates to exercise initiative and exploit opportunities using the commander's intent as a guide. This approach allows the unit to influence more of the enemy forces more of the time.

Arguably commanders will never have, when they need it, all the information to effectively command and control their units. It is important to understand the importance of relative abilities here. You do not have to have all the information. You just need more information than you enemy has to be successful.

Colonel Boyd captured this realization in the Boyd Cycle. The Boyd Cycle otherwise known as the "OODA Loop" conceptualizes conflict as a "series of time-competitive observation-orientation-decision-action cycles."[50] The concept defines maneuver warfare and embodies the essence of command by influence.

> If one side can consistently go through the OODA Loop faster than the other, it gains a tremendous advantage. By the time the slower side acts, the faster side is doing something different from what he observed, and his action is inappropriate. With each cycle, the slower party's

> action is inappropriate by a larger time margin. Even though he desperately strives to do something that will work, each action is less useful than its predecessor; he falls farther and farther behind. Ultimately he ceases to be effective.[51]

The object of maneuver warfare is to move through the OODA Loop faster than the enemy. Given this objective, what is the best way to C2?

Case Study: Command by Influence in the Western Campaign

Army Group A learned about maneuver warfare during the Western Campaign of 1940. The German military leaders in Army Group A established a daring precedent in May of 1940. They experimented with a new concept for the use of mechanized forces and experienced overwhelming success. In six weeks of fighting, the German Army conquered Holland, Belgium, and France and humiliated Britain forcing much of the British Expeditionary Force off the continent of Europe.[52] The following account establishes the ideas about C2 of maneuver warfare.

The German Army High Command developed a plan of attack that called for a rapid offensive operation enveloping the French Army and ultimately destroying them in decisive battle. Hitler gave the following guidance in Directive #6.

1. Carry out the offense as soon as possible.
2. It should take place on the northern flank of the front through Luxembourg, Belgium, and Holland.

3. Its purpose was to defeat as much as possible of the French Army and ... the Allies fighting on their side, and at the same time to win as much territory as possible in Holland, Belgium and northern France.[53]

There was much debate about the campaign plan for the Western Front. Guderian was the primary advocate of lightning warfare tactics. However, his chain of command all the way up to Hitler supported a much more traditional concept of *Vernichtungsgedanke*.[54] This concept called for decisive maneuver and encirclement by the whole attacking force, supported by the Luftwaffe's dive-bombers.[55] This approach was much slower than Guderian's lightning warfare albeit safer.

Guderian therefore had a difficult time getting support for his concept of lightening war.[56] He proposed deep, unsupported thrusts by mechanized formations. This tactic would, in effect, "out Boyd cycle" the enemy until ultimately the enemy becomes ineffective.[57] However, Matthew Cooper suggests that the German leaders not only actively discouraged this concept but positively feared it.[58] The German senior leadership considered Guderian's tactics "...threatening the outcome of the campaign."[59]

Army Group A launched their attack into the Ardennes on 10 May 1940. Three days later the army group crossed the Meuse. After the tenth day, the army group reached the coast, cutting off "...fifty per cent of their [French] forces on the Continent, and more than seventy-five per cent of their best equipment."[60] The battle was over by 4 June. The Germans continued the destruction of France on 5 June. Nine days later German forces occupied Paris and after just eight more days the French accepted the

German terms for an armistice. The entire campaign in the West lasted forty-six days. Matthew Cooper captures the significance of the German victory:

> A German Army had defeated a highly rated enemy, superior both in numbers and equipment; the defensive, so long believed to have been the strongest form of war, had been shattered by a decisive attack in which maneuver and organization counted for far more than men and weapons. The speed and decisiveness of the German victors had stunned and impressed their enemies.[61]

The speed of the attack left the world in shock wondering how this happened. Many military writers of the day developed explanations which helped them account for what one British officer termed a "ridiculous nightmare." He believed that the Germans had taken criminally foolish risks and gotten away with them.[62]

During the execution of the plan, there was great debate over how much control to exercise over the advancing panzer spearheads. Guderian pressed his chain of command all the way to Hitler to allow the panzer forces to exploit the opportunities to the maximum extent possible.[63]

Analysis

The basis of victory was the decentralized form of C2 whereby command by influence played an important part in the German success. The German Army attacked so quickly that the French military leaders feared that chaos would take "...hold of the armies as it has already taken hold of the civilian population."[64]

There are several useful concepts that the Germans employed during the planning and execution of this operation. Mission oriented orders, decisive points, and maneuver

warfare are useful concepts for the command-by-influence form of C2 first popularized by the German Army. Hitler laid out mission-type orders for the German Army specifying minimum objectives for the armies. Additionally Hitler and his senior generals spent much time determining the best location of their Schwerpunkt, meaning "heavy point." Everything revolved around this enemy weakness. The German Army focused on maneuver warfare and the indirect approach as an efficient means of attacking enemy weaknesses while avoiding their strengths. Their goal was to throw strength against enemy weakness using non-linear, decentralized and opportunistic tactics. The Germans made good use of reconnaissance to pull maneuver forces around the enemy's strong points. For example, during the Western Campaign, the German leadership took advantage of an enemy weakness in the south after they found out that the French had focused heaviest in the north for an expected attack.[65] They considered the use of reconnaissance an essential step to avoiding the enemy strength. Maneuver warfare considers the primary objective breaking the spirit and will of the opposing high command, not killing enemy troops or destroying enemy equipment.[66] Guderian broke the spirit and will by maintaining the momentum of his attack to get into the enemy's rear as quickly as possible, thereby demoralizing the entire force. Army Group A continued to exploit the success of the initial attack using decentralized and opportunistic tactics.

The decentralized approach used effectively by the Germans in both world wars is still popular today. Bouchard advances two primary reasons for decentralized control of military operations in his book *Command in Crisis*. First, limits on decision making and information processing severely constrain the ability of top-level decision makers to

effectively exercise close control of military operations. Second, the on-scene commander often has superior ability to control the employment of his forces. His information about the current tactical situation is normally superior to that of his superiors.[67] Edward Luttwak suggests in his book *Strategy: The Logic of War and Peace* that the on-scene commander requires initiative and flexibility to effectively cope with the "fleeting opportunities and sudden dangers of combat."[68] These ideas seem amazingly similar to the ideas that Guderian fought for.

Giving the on-the-scene commander the ability to make these kinds of decisions helps him manage uncertainty at his level. Clausewitz addressed uncertainty throughout his study. He defines friction as "the countless minor incidents -- the kind you can never really foresee -- [that] combine to lower the general level of performance so that one always falls short of the intended goal."[69] Friction adds to the uncertainty that the commander must deal with. **Martin Van Creveld's theory therefore follows naturally that only command forms which distribute uncertainty are likely to be more or less consistently successful.**[70]

Conclusion

The study of Guderian's decentralized maneuver warfare tactics has great significance to the Army today. This case study emphasized the importance of a command form the manages uncertainty well. Command by influence served Guderian well. The command form takes disorder in stride, considering it "...inevitable and even, insofar as it affects the enemy as well, desirable."[71] As leaders today develop the Army

After Next, it is important to consider a command form that will serve the military well in the midst of the increasing complexity of 21st Century warfare.

21st Century Warfare

Command by influence is an effective style in the context of contemporary warfare. Will this form of C2 be able to meet the needs of the 21st Century? Given the greatly improved capabilities of 21st century warfare future armies should be able to judge more accurately the enemy's intentions.[72] In effect, RMA, some believe, will effectively reduce the uncertainty in predicting what the enemy will do.

As we have previously, assume that a RMA will indeed provide near omniscience. The enemy will face confusion and disorder all along the front. Although this characteristic engenders many advantages, it generally makes operations harder to support. In such a situation, how will command by influence do under the five conditions of future warfare described by Dubik and Sullivan?

- ☑ **Increased lethality and dispersion**. Having a technological edge, the US will need less systems than the enemy and will be able to achieve greater dispersion and standoff. In contrast, the enemy will require more systems and will be less likely to achieve, or be capable of achieving, similar dispersion or standoff. Increased lethality and dispersion favors the US.
- ☑ **Achievement of greater mass and effect**. If the US fight decentralized then the enemy will likely disperse to respond to US forces. Therefore, decentralized operations will make achieving greater mass and effect more difficult for both the friendly and enemy forces. The difficulty associated with achieving mass and effect

stems from the coordination needed between the sensors, shooters, and C2 nodes in the battlespace. Achievement of greater mass and effect is a neutral factor.

☑ **Increased integration of technologies**. Decentralized operations will generally make integration of technologies more difficult. However, the enemy also decentralizes to better fight the US making the increased integration of technologies a neutral factor.

☑ **Increased volume and precision of fires**. Units are now separated by large distances making it difficult to develop higher volume of fires and maintain precision. The units will likely experience an overall lower volume of fires across the battlespace since great distances separate units in decentralized operations and each unit will determine where to prioritize their efforts. Additionally, decentralized operations makes higher volumes of fire harder to support logistically. Precision of fires will likely be degraded because the tempo and dispersion of forces may preclude using precision systems to locate enemy forces. Again, the enemy will respond to the decentralized US forces and face similar challenges achieving an increased volume and precision of fires. Therefore the increased volume and precision of fires in neutral.

☑ **Refinements in invisibility and detectability**. Refinements in invisibility and detectability will favor friendly forces along the front. Decentralized operations encourages maintenance of the initiative all along the front. Using decentralized operations the US forces will generally be able to maintain the initiative and therefore will be able to benefit from refinements in invisibility and detectablity. Refinements in invisibility and detectability favors the US.

There will be other key factors not readily apparent in the Dubik/Sullivan construct. First is greater flexibility. The decentralized approach provides maximum flexibility to the lowest levels. Liddell Hart's use of flowing water as an analogy to describe maneuver warfare emphasizes flexibility.

> If we watch a torrent [of water] bearing down on each successive bank or earthen dam, in its path, we see that it first beats against the obstacle, feeling and testing it at all points. Eventually, it finds a small crack at some point. Through this crack pour the first driblets of water and rush straight on. The pent up water on each side is drawn towards the breach.[73]

Just as water seeks the path of least resistance so too do small units commanded by influence. Command by influence therefore engenders flexibility.

Second, the decentralized approach encourages speed. Using Colonel Boyd's OODA Loop principle helps understand the reason a decentralized approach is faster. Because command by influence decentralizes C2 to the lowest levels, commanders freely exploit opportunities without the need for detailed requests and reports up and down the chain of command. Units all along the front aggressively seek to observe, orient, decide and act upon the "weak spot." Eventually, reconnaissance units will find this "weak spot," then, just as the water draws towards the breach so too will other units move towards the "weak spot." As more and more units begin to exploit this "weak spot," subsequent units move through the breach having faced little or no resistance. Command by influence engenders speed.

Command by influence accepts confusion and disorder as part of the normal operating environment. In fact, command by influence generates confusion and disorder by appearing strong across the front, making it difficult for the enemy to understand the plan of attack. This allows US forces to exploit the enemy's state of confusion thereby controlling the initiative.

Lieutenant General Paul K. Van Riper establishes the "...sole measure of effectiveness of any command and control component—technology, organization, procedure, whatever—is whether it facilitates timely decision making and execution."[74] Timely decision making and execution is the bottom line requirement for C2 in a combat environment. Command by influence promotes quick decision making and execution.

In the final analysis, the ability to control the initiative determines success. Command by influence helps control the initiative very well. Flexibility and speed ensures this. Command by influence in the 21st Century combines desirable characteristics. Not only does this form enjoy speed and flexibility, command by influence also enjoys the technological edge leading to advantages in two of the five conditions described by Dubik and Sullivan (Increased lethality and dispersion, Refinements in invisibility and detectability).

Speed and flexibility served Guderian very well during the Western Campaign. The consideration of Dubik and Sullivan's trends clearly show two trends as significant advantages for US forces. Figure 4 below records two trends as friendly advantages for the command-by-influence form of C2. However, just as Guderian relied on speed and flexibility to overwhelm the enemy 21st Century forces will similarly exploit weaknesses

in this way. By decentralizing uncertainty to the lowest levels, command by influence will provide a successful means of managing uncertainty for the commander in the 21st Century. Arguably mistakes at the platoon level are not as costly as mistakes at the division or corps level of command. This form is a potential candidate for the future C2 form.

Enemy	Friendly
	Increased lethality and dispersion
	Refinements in invisibility and detectability
	Speed
	Flexibility
Neutral	
Achievement of greater mass and effect	
Increased integration of technologies	
Increased volume and precision of fires	

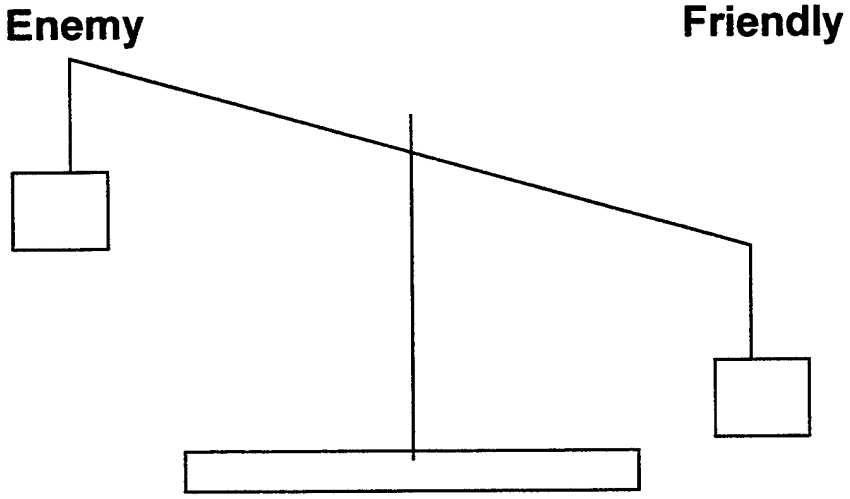

Figure 4 -- Command by Influence in Future Warfare

Summary

Command by influence served Guderian very well during Germany's Western Campaign of 1940. Considering Sullivan and Dubik's five trends of future warfare

suggest that two of the trends will be an advantage for a command form that is able to work well in confusion and disorder even while generating confusion and disorder for the enemy. This has the overall effect of mitigating uncertainty for the friendly force while maximizing uncertainty for the enemy thus creating an exploitable vulnerability. Command by influence will likely work effectively in the complexity of the battlespace of 2010.

These compelling arguments suggest that command by influence certainly favors US forces in 21st Century warfare. In the end, as illustrated in Figure 4, command by influence could result in superiority.

Chapter 5

Command by Direction

Fight the urge to increase the centralization of command and control functions because the end result would be a mitigation of the commander actually on the ground.[75]

Kenneth F. McKenzie
"Beyond Luddites and Magicians: Examining the MTR,"

Accepting that technology may provide additional capabilities to other forms of C2, this chapter harkens back to 19th Century warfare to see if once again command by direction could work effectively in 21st Century warfare.

Command by direction is the oldest of the three command forms. Command by direction is a highly centralized command form that was popular prior to and during the early part of the 19th Century. The form emphasizes the decision making capabilities of the leader. If the army is lucky and found a "genius" to command, then the fate of the army could be in good hands.[76]

Here are the mechanics of how command by direction works. The commander is very busy during the planning process directing the unit's preparation for battle. First,

perhaps with the benefit of modern technology, he conducts a personal reconnaissance of the key terrain. Next, he develops a plan to fight the enemy. Then he communicates this plan to his staff and subordinate commanders, ensuring they understand his plan for the fight. He also works hard to ensure he has a proper understanding of the enemy, the terrain, and friendly forces. Staffs emphasize providing the commander with all this information in order to facilitate good decision making during execution. In effect, the commander develops a data bank of information that will help him C2 during execution.

Prior to execution, the commander moves to a position where he can see the battle develop. Aided by modern technology, he monitors the final preparations for battle. Once he is satisfied that his command is prepared to fight, he initiates his plan. The fluid task of tracking the most important parts of his plan now begins. He uses his experience and battle command to direct critical parts of the plan. He makes decisions during the fight based on an intuitive sensing for how the battle should be fought.

The commander who commands by direction is responsible for developing and executing the plan. He makes all the decisions that influence the outcome of the battle.

Case Study: Napoleon's Command by Direction at Jena

Napoleon's Grande Armee, totaling 200,700 men, faced three Prussian armies totaling 119,000 men in the Battle of Jena. Napoleon personally directed the movements of six of his corps against the Prussian armies. Using two corps, Napoleon fixed the three armies while the remaining four corps enveloped the Prussian left flank. Napoleon commanded this battle by direction. He personally involved himself in every important aspect of the battle, making no less than 11 important command decisions and directing

no less than 9 actions.[77] Napoleon issued very detailed directives. Some of his directives specified what positions divisions and even regiments were to occupy. He personally reconnoitered positions and routes for units to follow. He personally synchronized a mutually supporting attack between two corps. Napoleon directed the commitment of a corps reserve when it looked as if one of his corps commanders needed help. Van Creveld suggests that Napoleon experienced span of control problems and consequently made mistakes throughout the battle.[78]

Analysis

In the growing complexity of today's military, commanders often hear Kenneth McKenzie's advice quoted in the epigraph to this chapter. Current commanders operate in an environment of "uncertainty" where the presence of incomplete and erroneous information challenges the commander at every turn. Even with the assistance of technology, the idea that one man could command future armies by direction seems remote.

History generally considers Napoleon one of the greatest battle captains of all times. The Duke of Wellington, Napoleon's enemy, credited his presence on the field as worth 40,000 men.[79] Others rank him alongside great leaders like Caesar, Frederick the Great, Gustavus Adolphus, Marlborough and Wellington.[80] Philip J. Haythornthwaite's book, *Napoleon's Military Machine,* recognized Napoleon's ability to "...control and direct up to half a million men under arms."[81] No other military leader has come close to achieving such success with these many men.

Napoleon took personal responsibility for the C2 of the entire French field army. Using his judgment, Napoleon was responsible for the decision making and leadership (command) as well the supervision and adjustment of the execution (control) to ensure mission accomplishment. History paints him as a masterful commander. However, even for the "genius," the noise and confusion of battle were too much for him to command and control.[82]

Napoleon could not command by direction because his span of control was not sufficient to allow him to command and control such a large army. Napoleon simply could not overcome all the friction, unpredictability, and disorder across the battlefield of the early 1800's.

Today, history credits Napoleon with revolutionizing 19th century command. Napoleon realized his limited ability to C2 and subsequently decentralized his control. He no longer tried to control the bulk of his forces. Van Creveld assessed that "...no longer was the commander [Napoleon] found doing everything important."[83] The role of Imperial Headquarters changed drastically — no longer were the corps commanders reliant on Napoleon to approve and direct every step of the operation. The resulting corps system that Napoleon developed was very successful.

Developing the corps system marked a shift in Napoleon's style of command from command by direction to command by plan. Napoleon and his staff made sweeping changes to their C2 doctrine. Van Creveld notes that to make this decentralization in command possible, there were several necessary changes:

> (a) Organize the army into self-contained, mission-oriented strategic units, each with its own proper commander, staff, and balance of all arms;
>
> (b) Institute a system of regular reports from the corps to General Headquarters, and of orders from the latter to the corps;
>
> (c) Organize a headquarters staff capable of dealing with all the traffic thus generated; and
>
> (d) Prevent the commander in chief from becoming a prisoner of that staff, to institute a directed-telescope system that would enable him to cut through the regular command hierarchy and take a look, at will, at any part of the army or obtain any kind of information that might be required at the moment.[84]

Napoleon's changes here marked the end of the era of command by direction made famous by Frederick the Great, Marlborough, Maurice de Saxe and other commanders prior to the nineteenth century.[85] Military leaders generally understood that the industrial revolution had forever changed the way armies fought. Now, because of the size and complexity of large standing field armies, commanders could no longer exercise direct command and control.

Napoleon commanded the battle of Jena by direction. He changed his style of command after this point to a command style that more closely models the command-by-plan style. Van Creveld suggests that the Battle of Jena marked the "end of an epoch." It was no longer "possible for a commander in chief to overlook a field and take a direct part in the conduct of the engagement."[86]

Napoleon was not able to provide adequate C2 for all his corps during the battle of Jena. He tried to involve himself in every important decision of the fight. He took

responsibility for planning the operation, preparing the Grande Armee for battle and executing the battle. He made key decisions and directed key actions throughout the battle to ensure the success of his plan. However, in the end, he was not enough.

An overall assessment of the suitability of this form of C2 suggests that the command by direction did not meet Napoleon's needs. Command by direction did not facilitate the commander's judgment to provide a simple but flexible plan to fight.

- The command-by-direction style did not facilitate good judgment across the battlefield for Napoleon. He could judge effectively only what was before him, that is, what he could see and hear in his sector. However, Napoleon's battlefield was expanding quickly and he did not have much power to direct what he could not see or hear. The extended battlefield forced him to rely on messengers and the directed telescope to sustain judgment in these areas. These methods helped him to maintain his presence but often times caused him to misinterpret the situation he faced.
- Command by direction did provide a simple albeit often times flawed plan to fight the enemy. Command by direction was simple because one person was in charge. The subordinate commanders only worry was executing violently Napoleon's directives. Command by direction was flawed because the commander often had to make decisions based on a very limited amount of information about the situation.
- The command-by-direction style did not provide a flexible approach to fighting. Because of the growing size and complexity, it is quite possible that many of Napoleon's directives created conflicting concerns for the commander on the ground. The centralized style of C2 checked the initiative of the subordinate commander. The

end result was that this type of C2 limited the subordinate commander's ability to exploit opportunities in some situations while avoiding risks in others.

Conclusion

The case study uses the Battle of Jena to point out that the battlefield had become complex enough in 1806 to preclude the command-by-direction form of C2. **Van Creveld suggests that command forms that centralize uncertainty do not lend themselves to success.**[87]

Today, technology seems to offer the opportunity to return to command by direction. Greatly improved situational awareness combined with faster processing and better communications capabilities excite in some modern day commanders the possibility of returning to the days of the "great battle captain."

21st Century Warfare

Command by direction met the needs of commanders before the 19th Century. Napoleon changed his command style after 1806 because the size and complexity of his operation grew beyond the capabilities of command by direction. Technology has empowered modern day commanders with the ability to see and influence the entire battlefield. So, will command by direction once again return as a viable command option for the 21st Century?

Greatly improved situationnal awareness stirs the notion of developing a super battle captain. That is, improving the capability of one man to provide direction for the entire fight. Some believe the RMA will reduce to known factors the variables of enemy capability, enemy location, terrain and weather effects, and even time, thereby effectively

reducing the uncertainty. Theoretically commanders will know exactly what the enemy is doing and have a good idea about what the enemy will do. These people theorize that the RMA will provide this capability for dominant battlespace knowledge (DBK). Improved capabilities provide future leaders with an improved awareness of the battlespace. DBK results from translating the awareness across a broad geographical area into an understanding that allows the commander to effectively influence the fight.[88] Given these capabilities, the idea of a super battle captain doesn't seem that remote.

Assume as we have for previous chapters that the RMA will indeed provide near omniscience. The enemy will possess a similar capability, even if perhaps a generation behind. Nonetheless, the US will have a technological edge. This proposition implies that one man will bear the responsibility of determining what the enemy will do and directing the US response in the battlespace. In such a situation, how will command by direction do under the five conditions of future warfare described by Dubik and Sullivan?

A centralized approach will emphasize the US advantage since one person will have the power to focus an entire unit's efforts and resources. In such a case, five of the five conditions will be to the US advantage. See Figure 5 for a comparative analysis of the command-by-direction form in future warfare.

☑ **Increased lethality and dispersion.** Having a technological edge, the US will need less systems than the enemy and will be able to achieve greater dispersion and standoff. In contrast, the enemy will require more systems and will be less likely to achieve similar dispersion or standoff.

☑ **Achievement of greater mass and effect.** Centralized control will favor massing on the enemy since one man will determine the priorities across the battlefield. Given a technological advantage, there will be a relative difference between US forces and their adversaries in the ability to quickly mass a large number and type of systems on each other. The relative ability to quickly mass fires will produce a decided advantage for the US forces.

☑ **Increased volume and precision of fires.** Centralized control can increase the volume of fires. Through directives the commander could control the volume of fires for specific types of targets and missions. Given relatively poor situational awareness, the enemy will not always be able to move systems in range to provide support for large volumes of fires.

☑ **Refinements in invisibility and detectability.** Given US technology advantages, refinements in invisibility and detectability will favor the friendly forces since friendly forces will better understand current and future friendly and enemy force dispositions. Enemy forces with lesser technology would suffer from the effects of a digitized battlespace where there is relatively little chance of deceiving US forces given their superior technology.

☑ **Increased integration of technologies.** Centralized control could positively affect the integration of technologies. Through directives the commander could control the use of technologies throughout the command. Given the US technology advantage, it will be harder for enemy forces to integrate all available technologies and bring them to

bear on US forces in a timely manner. Given improved technology, the US will likely be able to do the job faster.

However great these advantages may seem there is the inescapable complex nature of warfare that must be dealt with. Clausewitz' fog and friction will continue to play decisive roles in modern combat. Complexity says that knowing more is not necessarily an advantage. In complex systems cause and effect are not consistently or directly linked, and accurate and numerous data may not translate to accurate predictions of results. Clausewitz' notions of fog and friction go hand in hand with complexity. The capability to know more may not translate to knowing more about what the enemy will do; in fact, an enterprising enemy can take advantage of the US Forces' ineptness at deception operations, further engendered by a command-by-direction style, by "volunteering" information he wants known. Worse, friction predicts that knowing more and having perfect plans are not sufficient to ensure flawless execution.

Command by direction will not meet future commander's needs for C2 because it centralizes uncertainty. Command by direction forces one person to manage the uncertainty. In the battle of Waterloo, Napoleon was that one person. He commanded by assigning missions, prioritizing tasks, conducting risk assessment, formulating plans, and selecting the critical time and place for committing his forces.[89] Equally important, he controlled the battle by allocating means, monitoring status, analyzing information and correcting misguided actions.[90] He did this from a central location where he could develop his situational awareness by seeing himself [his forces], seeing the enemy, and seeing the

terrain. During Napoleon's earlier campaigns, the area of operations was small enough that Napoleon could command by direction.

Enemy	Friendly
Knowing more does not equal greater capability	Increased lethality and dispersion
Increased predictability of friendly forces	Increased volume and precision of fires
Less flexibility of friendly forces	Achievement of greater mass and effect
	Refinements in invisibility and detectability
	Increased integration of technologies

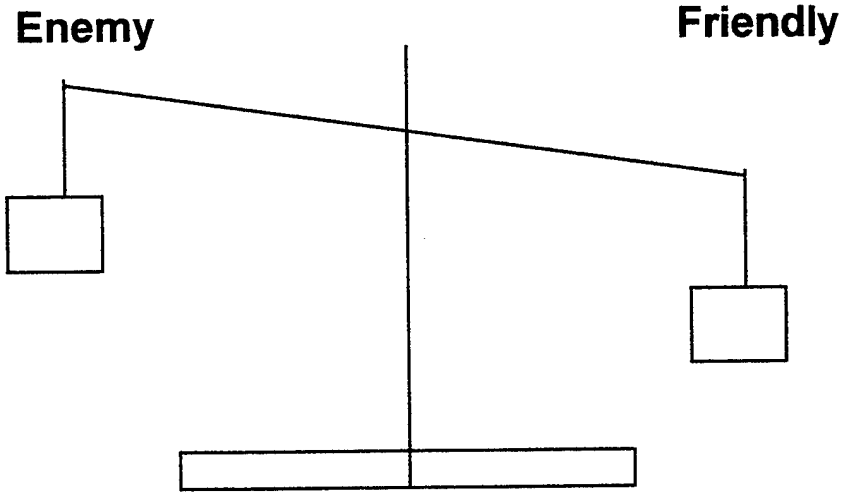

Figure 5 -- Command by Direction in Future Warfare

Summary

Command by direction is suitable for the C2 of forces in the 21st Century; however, closer examination reveals some inherent weaknesses. The success or failure of an entire military operation is dependent on the commander. Therefore, as Van Creveld theorizes and Napoleon proved, command by direction in a complex environment makes

it difficult to consistently ensure success. This command form becomes even more vulnerable when one considers the enemy's ability to decieve the commander. These reasons put the success of this command form at risk.

Chapter 6

Conclusions

> The Gulf War represents a latter-day Cambrai for MTR [military technical revolution] proponents. Like the British in 1917, the United States and its Allies were surprised by the success of their new technology, and were not fully prepared to exploit the opportunity it created. The use of space-based systems, precision munitions, stealth technology, global positioning systems, and theater missile defense all represented the first wave of the MTR. The key element of the equation, however, is whether or not we build on this victory.[91]
>
> Andrew F. Krepinevich
> *Issues in Science and Technology*
> Summer 1994

In the 21st Century, building on the victory of Desert Storm means changing to meet the needs of the environment. The changing dynamics of 21st Century warfare will force operational commanders to restructure C2.

This study focuses on three characteristics that describe the future environment: fog and friction, uncertainty, and complexity. Adapting to these three characteristics faster than the enemy allows friendly forces to maintain the initiative and ultimately determines success. Using a decentralized C2 style, command by influence maintains flexibility and speed. Command by influence in the 21st Century produces a highly adaptable form of C2 for a highly complex environment.

Command by influence works well in confusion and disorder by mitigating uncertainty for friendly forces while maximizing uncertainty for enemy forces. Command

by influence mitigates uncertainty at the lowest levels of command by probing the enemy all along the front to find enemy weaknesses. Once found, friendly forces exploit the enemy's vulnerability. The combination of flexibility and speed suggest that command by influence will work effectively in the complexity of the battlespace of 2010.

Andrew Krepinevich's analogy at the beginning of the chapter establishes the importance of continuing to adapt to the future environment. Exploiting the current RMA ensures that we continue to adapt. It is not enough to realize that we are at the beginning of the revolution if we don't use that realization to continue to adapt to the needs of future warfare. Just as Cambrai established hope for harnessing some of the potential of future warfare, so too did Desert Storm.

This study used three case studies to determine how each of the command forms functioned in contemporary warfare. Chapter 3 examined the merits of command by plan during the Battle of Saint Vith. The 106th Division found themselves unable to respond to the overwhelming assault of the German attack. Chapter 4 examined the German's Western Campaign of 1940, an extremely successful attack using the command-by-influence command form. Chapter 5 considered the Battle of Jena, a turning point for Napoleon. He evolved from a command by direction to a command-by-plan style of C2. These case studies established the contemporary usefulness of these command forms. Command by influence proved itself useful in 1940 and is worthy of consideration for future command forms.

In the context of each case study, this paper examined how each of the trends functioned in 21st Century warfare. Using General Sullivan and Colonel Dubik's five

trends of future warfare as a template for 21st Century warfare and considering the environment described by fog, friction, uncertainty, and complexity the study considered the usefulness of each command form.

- ☑ Command by influence provided a decentralized approach which would best meet the needs of an environment.
- ☑ Command by plan demonstrated a style of C2 that relied heavily on well-developed plans to respond to a myriad of enemy actions. The problem here is that uncertainty and complexity will likely complicate execution thus thwarting the ability to respond effectively to the many options open to the enemy.
- ☑ Command by direction offered a promising approach but seemed over-reliant on technology to cut through the uncertainty and complexity to deliver success.

Implications of this Study

Through an examination of history and analysis of case studies, the author reaffirms Martin Van Creveld's idea that uncertainty defines the structure of the command. Given an RMA, one might believe that future warfare can impose more certainty on the battlefield and thereby make the commander's job easier, thereby allowing a change in the C2 method. Clausewitz listed eight major sources of the "tremendous friction" that makes even the simplest plans and action so difficult to execute in war:

1. Insufficient knowledge of the enemy
2. Information gained by remote observation or spies
3. Uncertainly about one's own strength and position
4. The uncertainties that cause friendly troops to tend to exaggerate their own difficulties

5. Differences between expectations and reality
6. The fact that one's own army is never as strong as it appears on paper
7. The difficulties in keeping an army supplied
8. The tendency to change or abandon well-thought-out plans when confronted with the vivid physical images and perceptions of the battlefield.[92]

Many future thinkers fail to acknowledge that the basic nature of war still remains a contest of human will.[93] Since war remains a complex human endeavor, it is impossible to predict with certainty enemy responses. Each one of Clausewitz' eight factors requires human judgment which alone is a complex operation and can not be reliably predicted. Therefore, no amount of technology can totally eradicate uncertainty.

Accepting uncertainty as part of the basic nature of war has significant implications on the C2 form for future warfare. Future organizations will seek out command forms that work well in an uncertain environment. It is quite possible that the command-by-influence style of C2 will grow more popular in an effort to adapt to the nature of warfare in the 21st Century.

Using the three basic forms that Van Creveld proposes, only command by influence works well in an uncertain environment. Command by plan and command by direction have not demonstrated an ability to work well with uncertainty in contemporary warfare. The US doctrine should therefore focus more on command forms that will work well in future warfare. Command by influence is the command form that shows the most promise.

This study used Sullivan and Dubik's five trends as criteria to assess the most appropriate C2 form for the 21st Century. Sullivan and Dubik's ideas help describe

desirable characteristics but do not account for speed and flexibility which this study determined as essential characteristics. This study considered these two criteria compelling arguments for determining the most useful command form for the 21st Century.

As the army continues through the RMA fog and friction, uncertainty, and complexity will continue to shape the most appropriate command form. Fog and friction will continue to confront the human endeavor of command and control at every turn.. Although advances in technology will drastically change the form of war, they will not change the nature of war. Barry Watts explains the continued presence of friction as follows.

> The presence of humans in the loop—with all the diverse frailties, physical and cognitive limits, purposes, and decisions which their presence and participation entail—alone seems sufficient to render Clausewitzian friction impossible to eliminate entirely and, in all likelihood, extraordinarily difficult to reduce greatly in any permanent sense.[94]

Uncertainty will remain a dynamic. Given the uncertainties of war and the constant changes in the environment it may be impossible to "get it right." Therefore, the winning strategy may be to do a relatively better job of "getting it right" when compared to the enemy. Finally, growing complexity must be dealt with. The form of C2 must be able to function well in an environment where cause and effect aren't directly related. Growing complexity and friction will interact in such ways to "...produce human foibles, inaccessible information, and nonlinear dynamics."[95]

Endnotes

Chapter 1

[1] Martin Van Creveld, *Command in War,* (Cambridge: Harvard University Press, 1988), 265.

[2] General Sullivan and Colonel Dubik discuss these trends in their article, "Land Warfare in the 21st Century," in the September 1993 issue of Military Review.

[3] For more information of the RMA see Joint Force Quarterly's RMA essay contest in the Spring 1997 issue.

[4] Martin Van Creveld talks about each of the three styles (command by plan, command by direction and command by influence) of command in Chapter 8 of his book, *Command in War.*

[5] Eberhart Rechtin "Command and Control in the 2000+" *Principles of Command and Control,* ed by Jon L. Boyes and Stephen J. Andriole. (Washington, D.C., AFCEA International Press, 1987), 465.

[6] Agincourt Revisited: It was 25 October 1415 when some 6,000 English common soldiers defeated a French army of armored noble knights at least four times their size during the battle of Agincourt. This was the landmark battle of the Hundred Years War that marked a significant change in warfare.

With imaginative leadership and tactics, the English enticed the French into a frontal attack. As the slow moving knights waded through ankle deep mud in their heavy armor, they were cut down by English long bow archers on their flanks. By the time their depleted numbers reached the English lines, the French were easy victims to English yeomen using axes and swords.

The outcome of Agincourt was a crushing blow to the age of the armored knight and feudal warfare. Agincourt was one in a series of battles in that era that signaled a revolution in the way armies fought, maneuvered and organized themselves.

Chapter 2

[7] General Gordon R. Sullivan and Colonel James Dubik, "Land Warfare in the 21st Century," *Military Review* (September 1993), 13-32; Headquarters, Department of the Army (HQDA), *Army Focus: Force XXI* (Washington DC: US Government Printing Office (GPO), September 1994). HQDA, *Decisive Victory: America's Power Projection Army, White Paper* (Washington, DC: GPO, October 1994).

[8] The Quadrennial Defense Review was released 1 May 1977. In the words of General Shalikashvili, "The QDR represents our best thinking to date about how to maintain a trained, ready force to support national objectives and prepare for an uncertain future." The National Defense Panel (NDP) released its report December 1, 1997. Congress chartered the NDP to review the QDR and address the future defense and security needs of the US

[9] Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret, (Princeton: Princeton University Press, 1976), 101.

[10] General Dennis J. Reimer suggests that challenge and change are two issues that we have historically dealt with and will continue to deal with in the future. General Dennis

J. Reimer, "Challenge and Change: A Legacy for the Future," *Military Review,(July-August 1997*, 108.

[11] For example, the US Navy is moving towards a "network-centric" systems concept which places greater emphasis on the sensor, surveillance and weapon systems on a submarine, warship or aircraft, rather than the platform. Robert Holzer, "Navy Speeds Toward Centralized Information System," *Navy Times*, November 24, 1997, 35.

[12] James Stavridis, "The Second Revolution," *Joint Forces Quarterly* (Spring 1997): 8.

[13] Arsenio Gumahad, "The Profession of Arms in the Information Age," *Joint Forces Quarterly* (Spring 1997): 14.

[14] James J. Schneider, "Black Lights: Chaos, Complexity and the Promise of Information Warfare," *Joint Forces Quarterly* (Spring 1997): 22.

[15] William S. Cohen, Report of the Quadrennial Defense Review, Joint Force Quarterly (Summer 1997): 8.

[16] Ibid.

[17] Army Chief of Staff, *Force XXI, America's Army of the 21st Century*, (Washington, DC: Office of the Army Chief of Staff, 1996), 8.

[18] Institute for National Strategic Studies, *Strategic Assessment 1997* (Washington, DC, National Defense University, 1997), 2. Compare this to a recent article in Army Magazine: David A. Fastabend, "Endless Evolution," *Army (May 1997): 46.* Here the author suggests that technology doubles in efficiency every 18 months. It's not so important that we identify the exact rate of change. The important issue is to gain an appreciation for the environment of change that we live in.

[19] David A. Fastabend, "Endless Evolution," *Army (May 1997): 46*

[20] "The New Logic," *Armed Forces Journal* (January 1997): 42.

[21] Shalikashvili, 35.

[22] Shalikashvili, 26.

[23] M. Mitchell Waldrup, *Complexity: The Emerging Science at the Edge of Order and Chaos, (New York: Simon & Schuster, 1995), 11.*

[24] Waldrup, *11.*

[25] Peter Senge, *The Fifth Discipline*, (New York: Currency Doubleday, 24 March 1995), 71.

[26] Senge, 71.

[27] Senge, 364.

[28] Martin Van Creveld, *Command in War,* (Cambridge: Harvard University Press, 1988), 93.

[29] Van Creveld, 96.

[30] Robert Leonhard explains Auftragstaktik in his book *The Art of Maneuver.* Auftragstaktik, meaning "directive control," opposes Befehlstaktik meaning "control by detailed order" in German tactics. Auftragstaktik describes a method of C2 in which the commander communicates his intent with regard to the enemy as well as the mission of the friendly unit involved. He adds what details are absolutely necessary to facilitate the coordinated actions of his subordinates, but he refrains from telling them how to go about accomplishing the task. Rather he lets them use their expertise, their more intimate knowledge of their own men and equipment, and their greater familiarity with the terrain to develop their own methods. Their only constraint is that they must stay within the commander's intent. Robert Leonhard, *The Art of Maneuver*, (Novata: Presidio, 1992), 113.

Chapter 3

[31] Richard Nixon, *Khrushchev, Six Crises* (Garden City, NJ: Doubleday, *1962)*

[32] This definition is adapted from the American Heritage Electronic Dictionary, Third Edition, Houghton Mifflin Company, 1993.

[33] Headquarters, Department of the Army, *FM 101-5-1, Operational Terms and Graphics,* (Washington, D.C.: Department of the Army, September 1997), 1-45.

[34] Jerry Morelock, "The Defense of Saint Vith: A Case Study in Battle Leadership," (Washington, DC: National Defense University Press, April 1994), pages 175-288; excerpt reprinted in US Army Command and General Staff College, *C610 Syllabus/Book of Readings* (Fort Leavenworth: USACGSC, July 1996),10-11.

[35] Morelock , 12.

[36] Morelock , 11.

[37] Hugh Cole, *The United States Army in World War II. European Theater of Operations. The Ardennes: The Battle of the Bulge* (Washington DC: GPO, 1965), 170.

[38] Center for Army Lessons Learned, *NTC Trends Compendium, (Fort Leavenworth, Combined Arms Center, 1997), A-3.*

[39] Author's observation while assigned as an observer controller at the US Army National Training Center.

[40] Roger H. Nye, The Patton Mind (Garden City Park, NY: Avery Publishing Group Inc., 1993), 99.

[41] Czerwinski, 124.

[42] Van Creveld, 269.

[43] Clausewitz, 140.

[44] William A. Owens emphasizes the advantages of 21st Century Technology in the introduction to NDU's book *Dominant Battlespace Knowledge.* William A. Owens, *Dominant Battlespace Knowledge*, ed. Stuart E. Johnson and Martin C. Libicki, (Washington, DC. : National Defense University, 2 July 1996), 1-14.

[45] Arsenio Gumahad presents the concept of information as a weapon in his award winning argument of *The Profession of Arms in the Information Age.* Lieutenant Colonel Arsenio Gumahad, "The Profession of Arms in the Information Age," *Joint Forces Quarterly* (Spring 1997): 19.

[46] William A. Owens explains the concept of DBK in the introduction to NDU's book *Dominant Battlespace Knowledge*. William A. Owens, *Dominant Battlespace Knowledge*, ed. Stuart E. Johnson and Martin C. Libicki, (Washington, DC. : National Defense University, 2 July 1996), 1-14.

[47] Barry D. Watts, "Friction in Future War," *Brassey's Mershon American Defense Annual*, edited by Williamson Murray and Allan R. Millet, (Washington: Mershon Center, 1996), 83.

Chapter 4

[48] W. Schall, "Fuhrungsgrundsatze in Armee und Industrie," *Wehrkunde, 1964, 8.*

[49] Czerwinski, 126.

[50] William S. Lind, *Maneuver Warfare Handbook*, (Boulder, Colorado: Westview Press, 1986), 5.

[51] Lind, 5-6.

[52] Matthew Cooper, *The German Army,* (Chelsea, Michigan: Scarborough House Publishers, 1978), 217.

[53] Cooper, 195.

[54] Von Schlieffen coined the expression *Vernichtungsgedanke,* the idea of annihilation which conveyed in a single striking term what he believed to be the end of all military endeavor--the total destruction of the enemy's forces, not by means of relatively slow, costly frontal attacks, but of swift, decisive blows from the flanks and the rear. Matthew Cooper, *The German Army,* (Chelsea, Michigan: Scarborough House Publishers, 1978), 133.

[55] Cooper, 219.

[56] Consider the following citations from Matthew Cooper, *The German Army,* (Chelsea, Michigan: Scarborough House Publishers, 1978) as examples of the controversy that existed in the German Army. Guderian fought continuously throughout the forty-six days of the Western Campaign for the opportunity to operate more independently. He believed that he could have moved faster if he did not have to wait for the infantry. (220) Cooper explains that on 15 May caution replaced daring. Cooper's words say it all. "The progress of the mechanized forces was to be governed as much by the fears, hesitation, and conservatism of the senior generals as by the dash and brilliance of the panzer leaders." (222).

[57] The concept of out "Boyd Cycle the enemy belongs to William Lind. William S. Lind, *Maneuver Warfare Handbook*, (Boulder, Colorado: Westview Press, 1986), 6.

[58] Cooper, 219.

[59] Cooper, 222.

[60] Cooper, 217.

[61] Cooper, 218.

[62] Ibid.

[63] Cooper, 219.

[64] Cooper, 242.

[65] Cooper, 219.

[66] Lind, Chapter 2.

[67] Joseph F. Bouchard, *Command in Crisis,* (New York: Columbia University Press, 7 July 1994), 35.

[68] Luttwak, *Strategy: The Logic of War and Peace,* (Cambridge: Belknap Press, 1974), 13.

[69] Clausewitz, 119-121.

[70] Van Creveld, 188.

[71] Ibid.

[72] Watts, 90.

[73] Lind, 19.

[74] Paul K. Van Riper, "Information Superiority," *Marine Corps Gazette* (May 1997): 58.

Chapter 5

[75] The author adapted the cartoon from an article in *Dominant Battlespace Knowledge*. The Center for Advanced Concepts and Technology, National Defense University, *Dominant Battlespace Knowledge*, ed. Stuart E. Johnson and Martin C. Libicki, (Washington, DC. : National Defense University, 2 July 1996), 75. The quotation comes from Kenneth F. McKenzie, Jr., "Beyond Luddites and Magicians: Examining the MTR," *Parameters*, (Summer 1995), 17.

[76] Clausewitz, 100.

[77] See Appendix C: Napoleon's C2 at Jena for a detailed account of his actions and decisions.

[78] Van Creveld points out the following mistake. Upon hearing a report that Lannes was battling some 40,000 Prussians, Napoleon jumped to the conclusion that the entire Prussian Army was attacking Lannes. This conclusion was very different from what he had earlier told Murat. This caused a flurry of directed troop movements which may not have been altogether necessary. The problem of centrally directing such a large force in battle suggests a span of control problem. The French Army fought the battle based on an "Order of the Day" drafted at 0100 hours on the 14th. This order did not get to two of his corps commanders, Davout (III Corps) and Bernadotte (I Corps). Napoleon gave all other commands by word of mouth throughout that day's fighting. This was a major undertaking considering the compartmentalized nature of the terrain and the size of the battlefield (approximately 35 square miles) as well as the number of forces engaged (320,000). These messages went no faster than the horses that the messengers road. To make things worst, Van Creveld suggests that Napoleon did not have a clear understanding of the enemy strengths and intentions. So, not only was he unable to coordinate the efforts of his entire force. What he was able to coordinate he based on an incorrect enemy situation.

[79] The Duke of Wellington originally made this statement. The quotation is used in the introduction of Philip J. Haythornthwaite's, *Napoleon's Military Machine,* (New York: Hippocrene Books, Inc., 1990), 6.

[80] Philip J. Haythornthwaite, *Napoleon's Military Machine,* (New York: Hippocrene Books, Inc., 1990), 6.

[81] Haythornthwaite, 12.

[82] Van Creveld, 96.

[83] Van Creveld, 97.

[84] Ibid.

[85] Van Creveld, 96.

[86] Van Creveld, 95.

[87] Van Creveld, 270.

[88] The Center for Advanced Concepts and Technology, National Defense University, *Dominant Battlespace Knowledge*, ed. Stuart E. Johnson and Martin C. Libicki, (Washington, DC. : National Defense University, 2 July 1996), 3.

[89] See Appendix A: Command and Control.

[90] See Appendix A: Command and Control.

Chapter 6

[91] Andrew F. Krepinevich *Issues in Science and Technology,* Summer 1994.

[92] Peter Paret, *Clausewitz and the State: The Man, His Theories, and His Times* (Princeton: Princeton University Press, 1976) 197-198.

[93] Many in this statement refers to the advocates of DBK. See Stuart Johnson and Martin Libicki's book entitled Dominant Battlespace Knowledge.

[94] Watts, 90.

[95] Watts, 91.

[96] Office of the Joint Chiefs of Staff, Joint Pub 1.02, Department of Defense Dictionary of Military and Associated Terms (Washington: GPO, 14 March 1997), 110.

[97] Ibid.

[98] Ibid.

[99] Office of the Joint Chiefs of Staff, Joint Pub 6-0, Doctrine for Command, Control, Communications, and Computer (C4) Systems Support to Joint Operations (Washington: GPO, 1 Dec 1989), GL-5.

[100] Earl H. Tilford, Jr., *The Revolution in Military Affairs: Prospects and Cautions* (Carlisle Barracks : Strategic Studies Institute, 1996), iii.

Appendices

[101] Headquarters, Department of the Army, *FM 100-5, Operations,* (Washington, D.C.: Department of the Army, June 1993), 2-14 - 2-16.

[102] Directorate of Advanced Concepts, Technologies and Information Strategies Institute for National Strategic Studies, *5.*

[103] This timeline was adapted from a section in Martin Van Creveld, *Command in War*, (Cambridge: Harvard University Press, 1985), 90-95. The attempt here is to show that Napoleon commanded by direction. He involved himself in the most important details of the fight.

Part I -- Abbreviations and Acronyms

ABCS	Army Battle Command System
ATACMS / BAT	Army Tactical Missile System / Brilliant Anti-Armor Submunition
AWACS	Airborne Warning Control System
C2	Command and Control
C4	Command, Control, Communications, and Computers
C4I	C4 +Intelligence
C4ISR	C4 + Intelligence, Surveillance and Reconnaissance
GCCS	Global Command and Control System
HARM	High Speed Antiradiation Missile
ISR	Intelligence, Surveillance and Reconnaissance
JAVELIN	Antitank Weapon
JSTARS	Joint Surveillance Target Attack Radar
MILSTAR	Satellite Communications Systems
MTI	Moving Target Indicator
OODA	Observe, Orient, Decide, and Act
RMA	Revolution in Military Affairs
SADARM	Sense and Destroy Armor
TACSAT	Tactical Satellite System
THAAD	Theater High Altitude Air Defense

Part II -- Terms and Definitions

Command and Control (C2) -- The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. Command and control functions are performed through an arrangement of personnel, equipment, communications, facilities, and procedures employed by a commander in planning, directing, coordinating, and controlling forces and operations in the accomplishment of the mission.[96]

Command and control system -- The facilities, equipment, communications, procedures, and personnel essential to a commander for planning, directing, and controlling operations of assigned forces pursuant to the missions assigned.[97]

Command, Control, Communications, and Computer Systems -- Integrated systems of doctrine, procedures, organizational structures, personnel, equipment, facilities, and communications designed to support a commander's exercise of command and control across the range of military operations.[98]

Command, Control, Communications, and Computer Systems (C4) -- Integrated systems of doctrine, procedures, organization structures personnel, equipment, facilities, and communications designed to support a commander's exercise of command and control across the range of military operations.[99]

Revolution in Military Affairs (RMA) -- Doctor Tilford of the Strategic Studies Institute defines RMA as a theory of radical change that ultimately alters the "...way military institutions organize, equip, and train for war, and the way war is itself conducted..."[100]

The Components of C2[101]

Command is the art of decision making and of leading and motivating soldiers and their organization into action to accomplish missions.

Command Functions:

- Visualizing
- Assigning missions
- Leading, guiding, and motivating and prioritizing
- Risk assessment
- Formulating concepts
- Anticipating change
- Selecting critical time and place

Control is the promulgation of the commander's decisions, guidance and intent with subsequent supervision and adjustment of subordinate force's execution to comply with commander's intent.

Control Functions:

- Determining requirements
- Allocating means
- Defining limits
- Monitoring status
- Describing interfaces
- Acquiring and applying means to accomplish intent
- Measuring, reporting and analyzing information
- Projecting change
- Correcting deviations from guidance

Sensors	C4I	Precision Force
AWACS	GCCS	SFW
RIVET JOINT	MILSTAR	JSOW
EP-3E	JSIPS	TLAM (BLK III)
JSTARS	DISN	ATACMS / BAT
HASA	JUDI	SLAW
SBIR	C4I FTW	CALCM
TIER 2 +	TADIL J	HAVE NAP
TIER 3 -	TRAP	AGM - 130
TARPS	TACSAT	HARM
MTI	JWICS	AIR HAWK
REMBAS	MIDS	SADARM
MAGIC	SONET	HELLFIRE II
ISAR	LINK - 16	TLAM (BLK IV)
FDS	DMS	JAVELIN
ATARS	SABER	THAAD

Table 1 -- Weapons and Systems in or Entering US Military Inventories[102]

Appendix C -- Napoleon's C2 at Jena

Timeline[103]

13 October 1806

- Napoleon completed his plan; only final preparations remained
- Murat (Cavalry) and Davout (III Corps) ordered to Dornburg. **[Key decision]**
- 1000 -- Napoleon issues fourth bulletin for the fight at Jena. [Key action]
- Napoleon moves forward toward Jena
- 1130 -- Napoleon orders Soult (IV Corps) to march to Kostritz
- 1330 -- Napoleon hears the sound of the guns at Jena
- 1500 -- Napoleon learns that Lannes (V Corps) was firing on 15,000 Prussian troops north of Jena with another 25,000 Prussians behind them. Napoleon believes that the entire Prussian Army attacked Lannes.
- Napoleon directs Lefebvre (Guard) and Ney (VI Corps) to march on Jena will all possible speed. **[Key decision]**
- Napoleon informs the other corps commanders of the developments of the day. [Key action]
- Napoleon moves forward to Lannes' Headquarters.
- Napoleon conducts a personal reconnaissance and personally directs the placement of Lannes' Division Commanders. **[Key decision]**

- When narrow roads block the advance columns of Lannes' Corps, Napoleon directed the widening of the road and stayed until traffic started moving again. **[Key decision]**
- Napoleon makes another personal reconnaissance. [Key action]
- 2200 -- Dictated orders for Davout to march on to Apolda so as to fall on the enemy's left. **[Key decision]**
- Napoleon sleeps

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- 0100 -- Dictates his order of the day. [Key action]
- 0400 -- Napoleon met with Lannes and Soult to give a verbal order. [Key action]
- Dawn -- Napoleon gives the order for Lannes in the center to attack thus giving Ney an ability to deploy onto the plain. **[Key decision]**
- 0900 -- Napoleon could see a gap opening between two of his corps (Lannes and Augereau). Napoleon directs troops and artillery to fill the gap forming the "grand battery of the center." **[Key decision]**
- 1000 -- Napoleon shifted his battle headquarters to the northwest to the height of Dornberg so as to follow Lannes's troops and oversee their action. [Key action]

- Napoleon orders two Guard Cavalry Regiments to relieve pressure on Ney. [Key action]

- Napoleon sends one messenger after another to indicate an objective for each division and regiment of Augereau's Corps. **[Key decision]**

- 1300 -- Napoleon sends out an order for a general advance. **[Key decision]**

- Napoleon observes Prussian troops who he believes intend to flank Lannes. Napoleon directs Lannes to form a square. **[Key decision]**

- Napoleon dispatched Lannes's reserve to prevent Lannes from being flanked. **[Key decision]**

- 1500 -- With the fighting nearly complete, Napoleon assesses the situation and orders one of Ney's divisions to take the only remaining threat from the rear. [Key action]

- With most of the fighting now complete, Napoleon issues instructions to take care of the wounded.

BIBLIOGRAPHY

Books

Air Force Chief of Staff, Command, Control, Communications and Computer Plans and Policy Division. Horizon: Air Force C4I Strategy for the 21st Century. Washington, D.C.: 1993.

Allard, C. K. *Command, Control and the Common Defense*. Washington, D.C.: National Defense University, 1996.

_____ "The Future of Command and Control: Toward a Paradigm of Information Warfare." Turning Point: The Gulf War and US Military Strategy. ed. L. Benjamin Ederington and Michael J. Mazaar. 161-192. Boulder , CO: Westview Press, 1994.

Army Chief of Staff. *Force XXI, America's Army of the 21st Century*. Washington, DC: Office of the Army Chief of Staff, 1996.

Bailey, Jonathan. *The First World War and the Birth of the Modern Style of Warfare.* Camberley: Strategic and Combat Studies Institute, 1996.

Bjorklund, Raymond C. *The Dollars and Sense for Command and Control.* Washington, D.C.: National Defense University Press, 1995.

Center for Advanced Concepts and Technology, National Defense University. *Dominant Battlespace Knowledge.* ed. Stuart E. Johnson and Martin C. Libicki. Washington, DC. : National Defense University, 2 July 1996.

Center for Army Lessons Learned. *NTC Trends Compendium.* Fort Leavenworth, Combined Arms Center, 1997.

Chairman Joint Chiefs of Staff. *Joint Vision 2010*. Washington, DC: Office of the Chairman of the Joint Chiefs of Staff, 1996.

Cesar, Edison M. *Strategies for Defining the Army's Objective Vision of Command and Control for the 21st Century*. Santa Monica: RAND, 1995.

Clausewitz, Carl Von. *On War*. ed. Michael Howard and Peter Paret. Princeton, New Jersey: Princeton University Press, 1984.

Coakley, Thomas P. *C3I: Issues of Command and Control.* Washington, D.C.: National Defense University Press, 1991.

Cole, Hugh *The United States Army in World War II. European Theater of Operations. The Ardennes: The Battle of the Bulge*. Washington DC: Government Printing Office, 1965

Cooper, Matthew. *The German Army.* Chelsea: Scarborough House Publishers, 1978.

Cushman, John H. *Command and Control of Theater Forces: Adequacy*. Washington, D.C.: AFCEA International Press, 1985.

Dubik, James M. and Gordon R. Sullivan. *Envisioning Future Warfare*. Fort Leavenworth, Kansas: US Army Command and General Staff College Press, 1995.

Dupuy, Trevor N. Curt Johnson and David L. Bongard. *The Harper Encyclopedia of Military Biography.* Edison: Castle Books, 1992.

Haythornthwaite, Philip J. *Napoleon's Military Machine.* New York: Hippocrene Books, Inc., 1990.

Headquarters, Department of the Army. *Army Focus: Force XXI*. Washington DC: US Government Printing Office, September 1994.

_____ *Decisive Victory: America's Power Projection Army, White Paper*. Washington, DC: Government Printing Office, 1994.

_____ *FM 100-5, Operations.* Washington, D.C.: Department of the Army, June 1993.

_____ *FM 101-5-1, Operational Terms and Graphics*. Washington, D.C.: Depatment of the Army, 1997.

_____ *Weapons Systems.* Washington, DC: US Government Printing Office, 1995.

Institute for National Strategic Studies. *Strategic Assessment 1997.* Washington, DC: National Defense University, 1997.

Leonhard, Robert. *The Art of Maneuver*. Novato: Presidio Press, 1992.

Lind, William S. *Maneuver Warfare Handbook.* Boulder, Colorado: Westview Press, 1986.

Libicki, Martin C. *Dominant Battlespace Knowledge: The Winning Edge.* Washington: National Defense University Press, 1995.

Luttwak, Edward N. *Strategy: The Logic of War and Peace.* Cambridge: Belknap Press, 1974.

Macgregor, Douglas A. *Breaking the Phalanx: A New Design for Landpower in the 21st Century.* Westport: Center for Strategic and International Studies, 1997.

Mandeles, Mark D. *Managing "Command and Control" in the Persian Gulf War.* Westport: Praeger, 1996.

McKnight, Clarence E. *Control of Joint Forces: A New Perspective.* Washington: AFCEA International Press, 1989.

Morelock, Jerry. "The Defense of Saint Vith: A Case Study in Battle Leadership." Washington, DC: National Defense University Press, April 1994.

Nixon, Richard. *Khrushchev. Six Crises* Garden City, NJ: Doubleday, *1962.*

Nye, Roger H. *The Patton Mind.* Garden City Park, NY: Avery Publishing Group Inc., 1993.

Office of the Joint Chiefs of Staff. JCS Pub1.02, *Department of Defense Dictionary of Military and Associated Terms. W*ashington: GPO, 1 December 1989

Office of the Joint Chiefs of Staff. JCS Pub 3-0, *Doctrine for Joint Operations.* Washington: GPO, 1 February 1995.

Office of the Joint Chiefs of Staff. JCS Pub 6-0, *Doctrine for Command, Control, Communications, and Computer (C4) Systems Support to Joint Operations.* Washington: GPO, 30 May 1995.

Office of the Joint Chiefs of Staff. *C4I for the Warrior.* Washington: GPO, 12 June 1994.

Paret, Peter. *Clausewitz and the State: The Man, His Theories, and His Times.* Princeton: Princeton University Press, 1976.

Rechtin, Eberhart. *Principles of Command and Control,* ed by Jon L. Boyes and Stephen J. Andriole. Washington, D.C.: AFCEA International Press, 1987

Schall, W. "Fuhrungsgrundsatze in Armee und Industrie," *Wehrkunde, 1964.*

Sun Tzu, *The Art of War,* trans. Ralph Sawyer. Boulder: Westview Press, 7 December 1994.

Swain, Richard M. *Lucky War: Third Army in Desert Storm.* Fort Leavenworth: US Army Command and General Staff College Press, 1994.

Senge, Peter. *The Fifth Discipline.* New York: Currency Doubleday, 1995.

Tilford, Earl H. *The Revolution in Military Affairs: Prospects and Cautions.* Carlisle Barracks: Strategic Studies Institute, 1996.

Training and Doctrine Command Pamphlet 525-5, *Force XXI Operations.* Washington, DC: US Government Printing Office, 1994.

Van Creveld, Martin L. *Command in War.* Cambridge: Harvard University Press, 1985.

Van Creveld, Martin. *The Transformation of War.* New York: Free Press, 1991.

Waldrup, M. Mitchell. *Complexity: The Emerging Science at the Edge of Order and Chaos.* New York: Simon & Schuster, 1995.

Watts, Barry D. "Friction in Future War," *Brassey's Mershon American Defense Annual,* edited by Williamson Murray and Allan R. Millet. Washington: Mershon Center, 1996.

Wishart, Leonard P. *CAC 2000: A Vision of the Future of The Combined Arms Command.* Fort Leavenworth: United States Army Combined Arms Center, 1990.

Articles

Ackerman, Robert K. "Military Planners Gird for Information Revolution." *Signal.* (May 1995): 71-76.

Biddle, Stephen. "Victory Misunderstood, What the Gulf War Tells Us about the Future of Conflict." *International Security.* Volume 21, Number 2 (Fall 1996): 139-179.

Boorda, Jeremy M. "Leading the Revolution in C4I." *Joint Forces Quarterly.* (Autumn 1995): 14-17.

Caldwell, Warren. "Promises, Promises." *Proceedings*. (January 1996): 54-57.

Cancian, Mark F. "Revolution is Incomplete." *US Naval Institute Proceedings*. Volume 122, Number 9 (September 1996): 70-73.

Cohen, William S. "Report of the Quadrennial Defense Review." *Joint Force Quarterly*. (Summer 1997): 8-14.

Czerwinski, Thomas J. "Command and Control at the Crossroads." *Parameters*. Volume 26, Number 3 (Autumn 1996): 121-132.

Deitchman, Shane D. "Future Battlefield Requires Cyberspace Warfare Strategy." *Signal*. (November 1995): 73-78.

Fastabend, David A. "Endless Evolution," *Army. (May 1997): 46.*

Fitzsimmonds, James R. "The Coming Military Revolution: Opportunities and Risks." *Parameters*. (Summer 1995): 30-36.

Ford, Christopher. "Dinosaur's Dilemma: The World of Joint Warfighting," *US Naval Institute Proceedings*. Volume 122, Number 9 (September 1996): 78-80.

Gumahad, Arsenio. "The Profession of Arms in the Information Age." *Joint Forces Quarterly*. (Spring 1997): 14-20.

Holzer, Robert. "Navy Speeds Toward Centralized Information System." *Navy Times*. November 24, 1997.

Jablonsky, David. "US Doctrine for the Revolution in Military Affairs." *Parameters*. (Autumn 1994): 18-36.

Krulak, Charles C. "Doctrine for Joint Force Integration." *Joint Forces Quarterly*. (Winter 1996): 20-23.

McKenzie, Kenneth F. "Beyond Luddites and Magicians: Examining the MTR." *Parameters*. (Summer 1995): 15-22.

Owens, William A. "A Report on the JROC and the Revolution in Military Affairs." *Marine Corps Gazette*. (August 1995): 47-53.

_____ "Emerging Systems of Systems." *Proceedings*. (May 1995): 35-39.

Peters, Ralph. "After the Revolution." *Parameters*. (Summer 1995): 7-14.

Reimer, Dennis J. "Challenge and Change: A Legacy for the Future," *Military Review*. (July-August 1997): 108-114.

Schneider, James. "Black Lights: Chaos, Complexity and the Promise of Information Warfare." *Joint Forces Quarterly*. (Spring 1997): 21-28.

Shalikashvili, John M. "Joint Vision 2010: America's Military--Preparing for Tomorrow." *Joint Forces Quarterly*. (Summer 1996): 34-49.

Stavridis, James. "The Second Revolution." *Joint Forces Quarterly*. (Spring 1997): 8-13.

Sullivan, Gordon R. and James Dubik. "Land Warfare in the 21st Century." *Military Review*. (September 1993), 13-32.

Van Riper Paul K. "Information Superiority." *Marine Corps Gazette*. Volume 81, Number 6 (June 1997): 54-62.

Monographs and Theses

Anno, Stephen E. and William E. Einspahr "Command and Control and Communications Lessons Learned." Research Report, US Air War College, 1988.

Gilbert, Daniel J. "Joint Task Force Command and Control and Communications: Have We Improved?" Master of Military Art and Science. Thesis, US Army Command and General Staff College, 1989.